

User Interface Design, Prototyping, and Evaluation

Introduction & Course Overview
CSE440: Introductory HCI

Prof. James A. Landay
University of Washington
Autumn 2007

September 27, 2007

Hall of Fame or Shame?

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Introduction & Course Overview
CSE440: Introductory HCI

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Outline

- Who are we?
- HCI introduction
- Course overview & schedule
- Introductions

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Who are we?

- James Landay
 - Associate Professor in CSE at the University of Washington
 - formerly professor in EECS at UC Berkeley
 - spent 3 years as Director of Intel Research Seattle (ubicomp lab)
 - Ph.D. in CS from Carnegie Mellon '96
 - HCI w/ focus on informal input (pens, speech, etc.), web design (tools, patterns, etc.), & Ubiquitous Computing
 - founded NetRaker, leader in web experience management
 - now subsidiary of KeyNote Systems
 - Co-authored *The Design of Sites* with D. van Duyne & J. Hong
- Scott Saponas
 - Ph.D. student in CSE
 - BS in Computer Science from Georgia Tech.
 - HCI w/ focus on ubiquitous computing

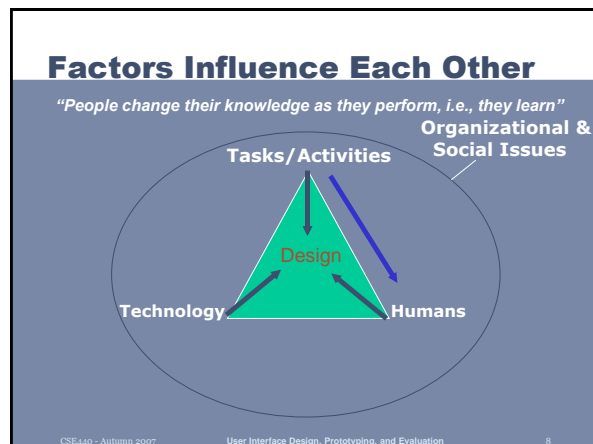
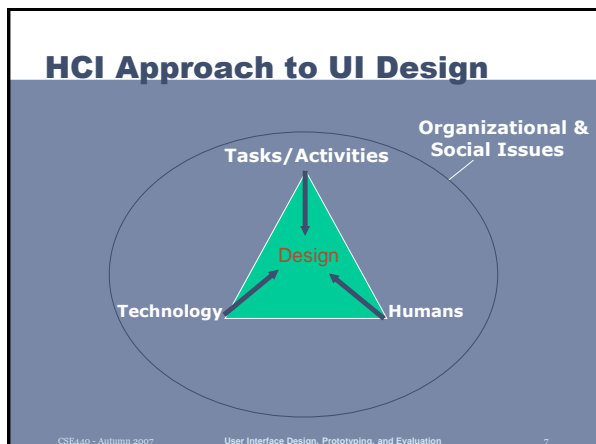
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Human-Computer Interaction (HCI)

- Human
 - the end-user of a program
 - the others in the organization
- Computer
 - the machine the program runs on
 - often split between clients & servers
- Interaction
 - the user tells the computer what they want
 - the computer communicates results



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User Interfaces (UIs)

- Part of application that allows people
 - to interact with computer
 - to carry out their task
- User vs. Customer vs. Client
 - user is a term only used by 2 industries → bad!
 - *customer* – person who will use the product you build
 - *client* – the company who is paying you to build it

HCI = design, prototyping, evaluation, & implementation of UIs

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Why is HCI Important?

- Major part of work for “real” programs
 - approximately 50%
- Bad user interfaces cost
 - money
 - 5% ↑ satisfaction → up to 85% ↑ profits
 - finding problems early makes them easier to fix
 - reputation of organization (e.g., brand loyalty)
 - lives (Therac-25)
- User interfaces hard to get right
 - people are unpredictable
 - intuition of designers often wrong

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Who Builds UIs?

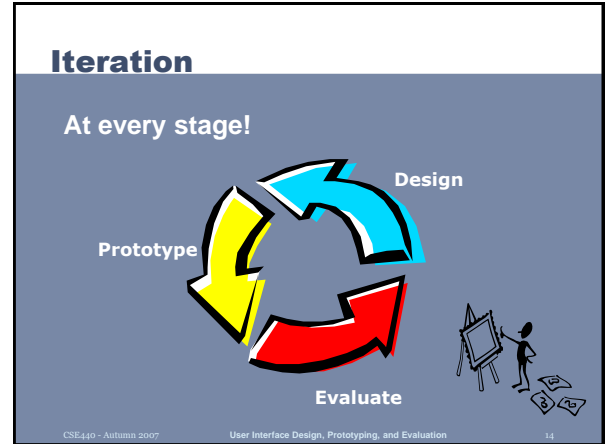
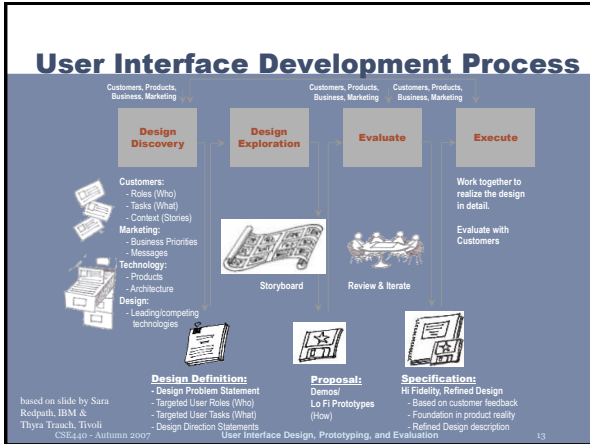
- A team of specialists (ideally)
 - graphic designers
 - interaction / interface designers
 - information architects
 - technical writers
 - marketers
 - test engineers
 - usability engineers
 - software engineers
 - customers

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How to Design and Build UIs

- UI Development process
- Usability goals
- User-centered design
- Task analysis & contextual inquiry
- Rapid prototyping
- Evaluation
- *Programming*

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Design

- Design is driven by requirements
 - what the artifact is for
 - not how it is to be implemented
 - e.g., PDA not as important as “mobile” app.
- A design represents the artifact
 - for UIs these representations include (2)
 - screen sketches or storyboards
 - flow diagrams/outline showing task structure
 - executable prototypes
 - representations simplify

Write essay
start word processor
write outline
fill out outline
Start word processor
find word processor icon
double click on icon
Write outline
write down high-level ideas

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Web Design Representations

Site Maps

Storyboards

Schematics

Mock-ups

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Usability

According to the ISO:
The *effectiveness, efficiency, and satisfaction* with which specified users achieve specified *goals* in particular environments

- This does not mean you have to create a “dry” design or something that is only good for novices – it all depends on your goals

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Usability/User Experience Goals

- Set goals early & later use to measure progress
- Goals often have tradeoffs, so prioritize
- Example goals
 - Learnable
 - faster the 2nd time & so on
 - Memorable
 - from session to session
 - Flexible
 - multiple ways to do tasks
 - Efficient
 - perform tasks quickly
 - Robust
 - minimal error rates
 - good feedback so user can recover
 - Discoverable
 - learn new features over time
 - Pleasing
 - high user satisfaction
 - Fun

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User-centered Design

“Know thy User”

- Cognitive abilities
 - perception
 - physical manipulation
 - memory
- Organizational / job abilities
- Keep users involved throughout
 - developers working with target customers
 - think of the world in users terms
 - not technology-centered/feature driven

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Task Analysis & Contextual Inquiry

- Observe existing work practices
 - augment with self-report tools (e.g., ESM)
- Create examples & scenarios of actual use
- “Try-out” new ideas before building software



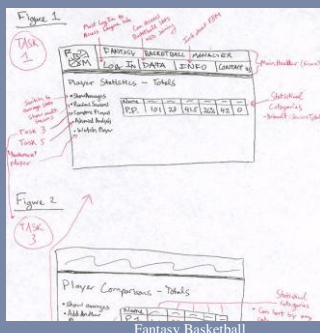
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Rapid Prototyping

- Build a mock-up of design so you can test
- Low fidelity techniques
 - paper sketches
 - cut, copy, paste
- Interactive prototyping tools
 - HTML, Visual Basic, Flash, DENIM, etc.
- UI builders
 - Visual Studio .NET, JBuilder...



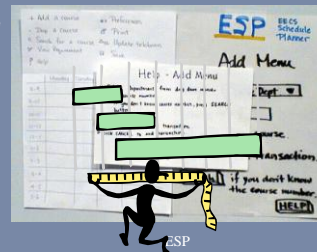
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Evaluation

- Test with real customers (participants)
 - w/ interactive prototype
 - low-fi with paper “computer”
- Build models
 - GOMS
- Low-cost techniques
 - expert evaluation
 - walkthroughs
 - online testing



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Goals of the Course

- 1) Learn to design, prototype, & evaluate UIs
 - the needs & tasks of prospective customers
 - cognitive/perceptual constraints that affect design
 - technology & techniques used to prototype UIs
 - techniques for evaluating a user interface design
 - importance of iterative design for usability
 - how to work together on a team project
 - communicate your results to a group
 - key to your future success
- 2) Understand where technology is going & what UIs of the future might be like

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Course Format

- Interactive lectures
- Quarter long project & homeworks
- Readings
- All material is online
 - slides, exercises, readings, schedule
 - <http://www.cs.washington.edu/cse440>
- Have fun & participate!

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Project Examples (cont.)

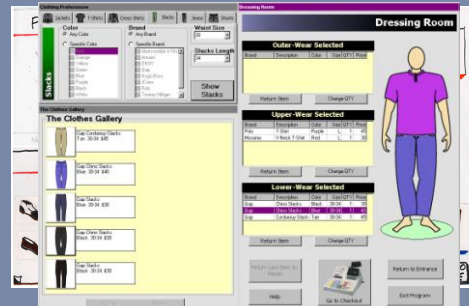
- *Clothes Shopper*
 - online shopping
 - knows your prefs & sizes

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Clothes Shopper



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Project Examples (cont.)

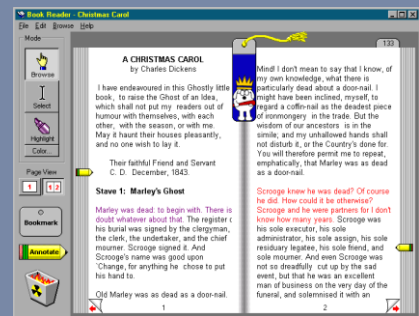
- *Electronic book reader*
 - take advantage of all the online texts on the net

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Electronic Book Reader



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Project Examples (cont.)

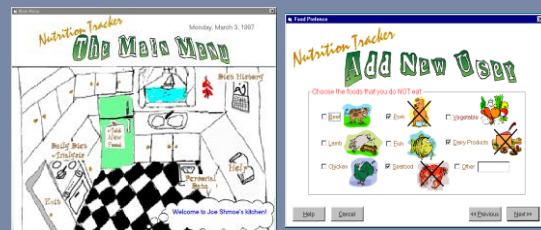
- *Nutrition tracker*

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Nutrition Tracker



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Project Examples (cont.)

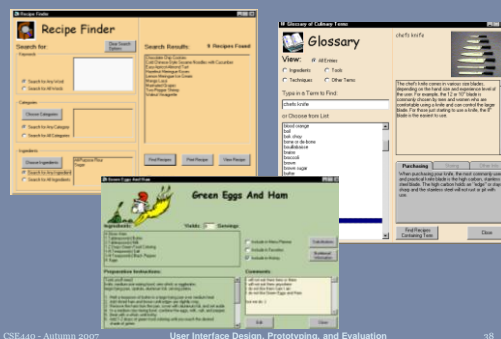
- *cUzine*
 - recipe tool for the home

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cUzine



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Project Examples (cont.)

- Read WWW over phone
 - find structure in pages & build voice menus
 - navigation problem
 - cache common paths & reorder?
- *PDA brainstorming tool*
 - small portable computers in a group meeting (say Palm Pilots)

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Project Examples (cont.)

- Runner's training log
 - input daily workouts
 - reports
 - reminders
- *Mobile shopping*
 - scan in UPC & tells you whether a good price? environmentally friendly?
- *Home entertainment control* – “no more remotes”

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Total Entertainment Control



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Project Examples (cont.)

- *PDA Baseball score keeper*
 - have stats of the players on your PDA
 - keep track of what happens during the game
 - upload stats after the game

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PDA Baseball Scorekeeper

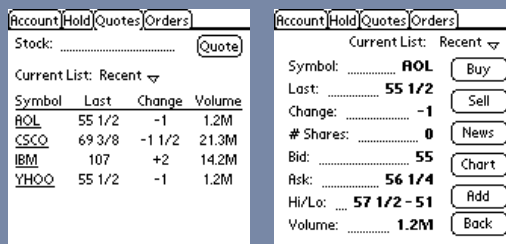


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PalmStock



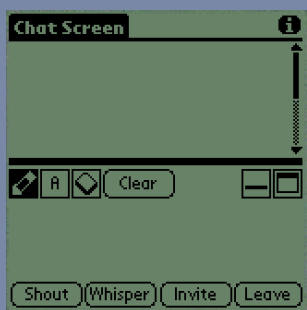
PalmStock

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InkChat



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Nutrition/Exercise Tracker

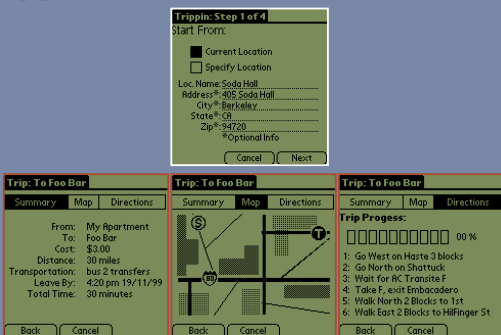


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Trippin'



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Traffic Monitor

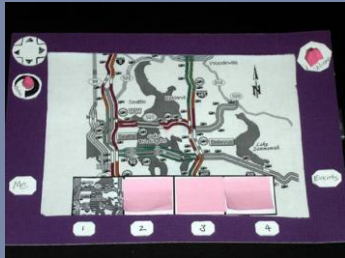


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Traffic Monitor



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Traffic Monitor

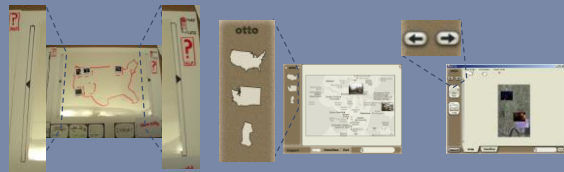


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Otto: Location-based Photos

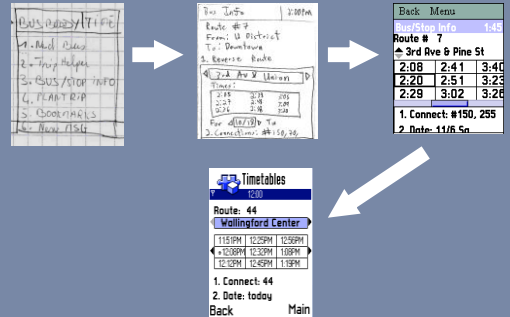


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Bus Buddy

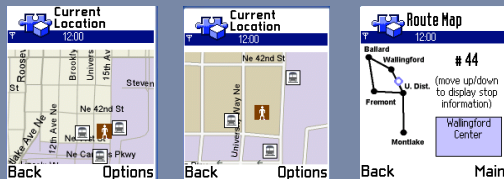


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Bus Buddy

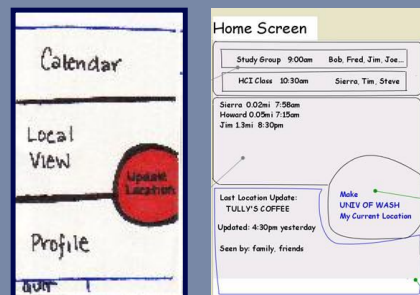


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Cluster



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Cluster

The diagram illustrates a 'Cluster' menu system. At the center is a 'cluster' menu with a 'Status' option selected. Surrounding it are other menu options: 'Nearby Friends', 'Calendar', 'Location', and 'Visibility'. The 'Status' menu is expanded to show a list of friends and their activities: 'doing HW at Starbucks', 'Carolyn Holmes with jeff...', 'Chris Govella compiling...', 'Dimitri Chmelav 466', 'Fred Potter clustering...', 'Jack Hebert', and 'Jeff Hughes with carolyn...'. A 'Menu' button is at the bottom of the expanded status menu.

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Mobile/Ubiquitous Computing Project Themes

- **Location-enhanced computing**
 - Devices that are aware of their location
 - past examples include car navigation, Trippin', finding nearby restaurants, etc
- **Activity-based computing**
 - applications that use inference of human physical activity to enhance our lives
 - helping care for an elder
 - helping people stay fit
 - exercise & nutrition
- **Ubiquitous RFID**
 - tags & readers
- **Domains of special interest**
 - environment
 - developing world

A mobile phone is shown on the right side of the slide. Below it, a person is seen using a handheld device, possibly a PDA or a specialized mobile phone, in a social setting.

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Administrivia

- **Registration**
 - limited by room and project constraints to 40
 - appeal email to me if not enrolled (due today at 5 PM)
 - tell us why you should be in the course
 - background, interests, what you can contribute
 - will email admits by Monday at 5 PM
- **Roll**
- **James' office hours**
 - Wed. 10:30-11:30 AM (642 Allen Center)
 - Mon. 3-4 PM online (send Scott Yahoo/MS/Google ID)
 - email landay@cs for appointments at other times

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Administrivia (cont.)

- **Teaching assistants**
 - Scott Saponas
 - First initial last name at cs.washington.edu
 - O.H.: TBA
- **Discussion sections**
 - TBD – please respond to Scott's email
 - new material will be covered in discussion
 - attend

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Books

- **The Design of Sites** by van Duyne, Landay, & Hong
 - I'll give you copies of the 4-5 chapters we will use
- We will also hand out other papers, give you web links, & refer to lecture slides
- **Recommended textbooks**
 - Human-Computer Interaction by Alan Dix, et. al., 3rd edition, 2003
 - order from Amazon.com (link off class web page)
- **Other recommended books on web page**

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Assignments (tentative)

- **Individual**
 - 3 written + one talk each
- **Group**
 - 5 written assignments
 - 3 presentation/demos with the write-ups
 - all group work handed in on Web (group web site)

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Grading

- A combination of
 - midterm (15%)
 - final (25%)
 - individual assignments (15%)
 - group project (40%)
 - demos/presentation (group component)
 - project write-ups and exercises
 - ratings given by other team members & class
 - in class participation (5%)
- No curve

Tidbits

- Late Policy
 - no lates on group assignments
 - individual assignments lose one letter grade/day
- Cheating policy
 - will get you an F in the course
 - more than once can get you dismissed
- More information (syllabus/schedule/slides)
 - <http://www.cs.washington.edu/cse440>

Summary

- Project proposal due at start of lecture on Tuesday
- Next lecture on History of HCI
- Read
 - [As We May Think](#) by Vannevar Bush
 - [Tools For Thought Ch 9 \(Engelbart Demo\)](#)